

Report to Congress pursuant to the  
Shark Finning Prohibition Act of 2000  
(Public Law 106-557)

Prepared by the National Marine Fisheries Service  
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## **Table of Contents**

1. Introduction
  - 1.1 Management Authority in the United States
  - 1.2 Current Management of Sharks in the Atlantic Ocean
  - 1.3 Current Management of Sharks in the Pacific Ocean
  - 1.4 U.S. Regulations to Implement the Shark Finning Prohibition Act
  
2. U.S. Imports and Exports of Shark Fins in 2001
  - 2.1 Exports of Shark Fins
  - 2.2 Imports of Shark Fins
  
3. International Efforts to Advance the Goals of the Shark Finning Prohibition Act
  - 3.1 Bilateral Efforts
  - 3.2 Regional Efforts
    - 3.2.1 Northwest Atlantic Fisheries Organization (NAFO)
    - 3.2.2 Inter-American Tropical Tuna Commission (IATTC)
    - 3.2.3 International Commission for the Conservation of Atlantic Tunas (ICCAT)
    - 3.2.4 Multilateral High-Level Conference on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific (MHLCP)
    - 3.2.5 South Pacific Tuna Treaty (SPTT)
    - 3.2.6 International Council for the Exploration of the Seas (ICES)
    - 3.2.7 Asia Pacific Economic Cooperation (APEC) and the Convention on Migratory Species
    - 3.2.8 North Pacific Interim Scientific Committee for Tuna and Tuna-like Species (ISC)
    - 3.2.9 Sub-Saharan Africa
    - 3.2.10 Department of State's Regional Environmental Hub Program
  - 3.3 Multilateral Efforts
    - 3.3.1 Food and Agriculture Organizations of the United Nations (FAO), Committee on Fisheries (COFI)
    - 3.3.2 International Union for the Conservation of Nature and Natural Resources (IUCN)
    - 3.3.3 Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)
  
4. National Marine Fisheries Service Research on Sharks
  - 4.1 Data Collection and Stock Assessments
  - 4.2 Incidental Catch Reduction
  - 4.3 Post-Release Survival
  
5. Conclusion

## **1. Introduction**

Sharks are fish in the class Chondrichthyes, or cartilaginous fishes. As a group, sharks (and other elasmobranchs, such as skates and rays) present an array of issues and challenges for fisheries management and conservation. They are generally at the top of the food chain and their abundance is relatively small compared to groups at lower trophic levels. They are often characterized by late age of maturity and relatively slow growth and reproductive rates. Historically, compared to many bony fishes, sharks have had relatively low economic value, and thus have been a lesser priority for fisheries research and management.

In recent years, however, there has been increasing concern about the status of shark stocks and the sustainability of their exploitation in world fisheries. As the commercial value of some species and/or shark products has grown, there have been increased international fishing efforts directed at sharks and there is increasing evidence of overfishing. In turn, several international initiatives have been undertaken to promote greater understanding of sharks in the ecosystem and greater efforts to conserve the many species taken in world fisheries.

On December 21, 2000, President Clinton signed into law the Shark Finning Prohibition Act (Act). Section 3 of the Act amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to prohibit any person under U.S. jurisdiction from (i) engaging in the finning of sharks; (ii) possessing shark fins aboard a fishing vessel without the corresponding carcass; and (iii) landing shark fins without the corresponding carcass. Section 9 of the Act defines finning as the practice of taking a shark, removing the fin or fins from a shark, and returning the remainder of the shark to the sea. The Act also requires the National Marine Fisheries Service (NMFS) to promulgate regulations to implement the prohibitions of the Act (Section 4), initiate discussion with other nations to develop international agreements on shark finning and data collection (Section 5), provide Congress with annual reports describing efforts to carry out the Act (Section 6), and establish research programs (Sections 7 and 8). This Report to Congress fulfills the requirements of Section 6 and provides a description of NMFS activities relative to other sections of the Act.

### **1.1 Management Authority in the United States**

The Magnuson-Stevens Act is the primary domestic legislation governing management of marine fisheries in the U.S. EEZ. The Magnuson-Stevens Act calls for the conservation and management of resources and the marine environment, of which sharks, skates and rays (also called elasmobranchs) are a part. In 1996, the U.S. Congress re-authorized the Magnuson-Stevens Act and included new provisions that require fishery managers to halt overfishing; rebuild overfished fisheries; minimize bycatch and bycatch mortality to the extent practicable; and describe, identify, and conserve essential fish habitat (EFH). In addition, Federal fisheries management must also be consistent with the requirements of other legislation including the Marine Mammal Protection Act, the Endangered Species Act (ESA), the National Environmental Policy Act, the Regulatory Flexibility Act, the Paperwork Reduction Act, the Coastal Zone Management Act, the Administrative Procedures Act, and other relevant Federal and State laws.

In general, waters under the jurisdiction of the individual states extend from the shoreline out to 3 miles (9 nautical miles off Texas, the west coast of Florida, and Puerto Rico), while U.S. waters under Federal management continue from the outer edge of state waters to 200 miles offshore except where intercepted by the EEZ of another nation. Management of elasmobranchs in state waters usually falls under the authority of state regulatory agencies, which are typically the marine division of the state fish and wildlife departments. Each state develops and enforces its own fishing regulations for waters under its jurisdiction.

Many times these state regulations complement, or are more restrictive than, Federal regulations that address shark fishing in the EEZ. However, Federally permitted commercial fishermen in the Atlantic are required to follow Federal regulations regardless of where they are fishing as a condition of the permit, unless the State's requirements are more restrictive. Given that many shark nursery areas are located in waters under state jurisdiction, states play a critical role in effective shark conservation and management.

Cooperative management of the fisheries that occur in the jurisdiction of two or more states and Federal waters may be coordinated by an interstate fishery management commission. Three interstate commissions exist: the Pacific States Marine Fisheries Commission (PSMFC), the Atlantic States Marine Fisheries Commission (ASMFC), and the Gulf States Marine Fisheries Commission (GSMFC). While states set fishery regulations in their own waters, they are encouraged to adopt compatible regulations between state and Federal jurisdictions. The Atlantic Coast Fisheries Cooperative Management Act (ACFCMA) established a special management program between NMFS, the Atlantic coast states, and the ASMFC.

In summary, numerous management entities govern fisheries in which sharks are directed catch, incidental catch, and/or bycatch. The Magnuson-Stevens Act forms the basis for management in Federal waters and requires NMFS and the Councils to take specified actions. States agencies and Commissions are bound by state regulations and, in the Atlantic region, by ACFCMA.

## **1.2 Current Management of Sharks in the Atlantic Ocean**

Development of fishery management plans (FMPs) is the responsibility of one or more of the eight regional fishery management councils, except in the case of Atlantic highly migratory species (defined as tunas, marlins, oceanic sharks, sailfish, and swordfish). Since 1990, shark fishery management in Federal waters of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (excluding dogfishes, skates, and rays) has been the responsibility of the Secretary of Commerce, delegated to NMFS. Dogfish, skates, and rays in the Atlantic Ocean are managed by the New England Fishery Management Council (NEFMC), the Mid-Atlantic Fishery Management Council (MAFMC), the South Atlantic Fishery Management Council (SAFMC), the Gulf of Mexico Fishery Management Council (GMFMC), or the Caribbean Fishery Management Council (CFMC).

Atlantic sharks have traditionally been separated into three species groups for stock abundance assessments: large coastal sharks (22 species), small coastal sharks (seven species), and pelagic sharks (ten species). The 1999 FMP for Atlantic Tunas, Sharks and Swordfish further divided the large coastal shark group into ridgeback and non-ridgeback species for more effective management, shifted several species from the large coastal sharks, small coastal sharks, and pelagic management sub-units to the prohibited species sub-unit, and established an additional management unit (see Table 1.2). Thirty-three shark species that were previously included only for data reporting are now included in the shark management unit called "Deepwater and Other Sharks."

Finning of large coastal sharks, small coastal sharks, and pelagic sharks has been prohibited for Federal shark permit holders in waters of the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea since 1993. Finning of the "Deepwater and Other Sharks" category was prohibited in the 1999 FMP for Atlantic Tunas, Sharks and Swordfish, and the finning of spiny dogfish in this region was prohibited in 2000.

Information on Atlantic shark fisheries is updated annually in the Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic HMS. The Atlantic Highly Migratory Species (HMS) Management Division maintains a website at [www.nmfs.noaa.gov/sfa/hmspg.html](http://www.nmfs.noaa.gov/sfa/hmspg.html). This website includes links to current fishery regulations (50 CFR 635), shark landings updates, the U.S. NPOA for Sharks, the

Table 1.2 Atlantic Sharks in the management unit by species groups.

**Prohibited Species**

Sand tiger Bigeye	<i>Odontaspis taurus</i>
sand tiger	<i>Odontaspis noronhai</i>
Whale	<i>Rhincodon typus</i>
Basking	<i>Cetorhinu's maximus</i>
White	<i>Carcharodon carcharias</i>
Dusky	<i>Carcharhinus obscurus</i>
Bignose	<i>Carcharhinus altimus</i>
Galapagos	<i>Carcharhinus galapagensis</i>
Night	<i>Carcharhinus signatus</i>
Caribbean reef	<i>Carcharhinus perez</i>
Narrowtooth	<i>Carcharhinus brachyurus</i>
Caribbean sharpnose	<i>Rhizoprionodon porosus</i>
Smalltail	<i>Carcharhinus porosus</i>
Atlantic angel	<i>Squatina dumerili</i>
Longfin mako	<i>Isurus paucus</i>
Bigeye thresher	<i>Alopias superciliosus</i>
Sevengill	<i>Heptranchias perlo</i>
Sixgill	<i>Hexanchus griseus</i>
Bigeye sixgill	<i>Hexanchus vitulus</i>

**Large Coastal Sharks**

(Some species in the large coastal sharks management unit are characterized by a mid-dorsal ridge that is easily identified even after the fish has been headed, gutted, and finned. This mid-dorsal ridge is useful as a diagnostic characteristic for management and enforcement purposes.)

**Ridgeback Species**

Sandbar	<i>Carcharhinus plumbeus</i>
Silky	<i>Carcharhinus falcifonnis</i>
Tiger	<i>Galeocerdo cuvieri</i>

**Non-Ridgeback Species**

Blacktip	<i>Carcharhinus limbatus</i>
Spinner	<i>Carcharhinus brevipinna</i>
Bull	<i>Carcharhinus leucas</i>
Lemon	<i>Negaprion brevirostris</i>
Nurse	<i>Ginglymostoma cirralum</i>
Scalloped hammerhead	<i>Sphyrna lewini</i>
Great hammerhead	<i>Sphyrna mokarran</i>
Smooth hammerhead	<i>Sphyrna zygaena</i>

### Small Coastal Sharks

Atlantic sharpnose	<i>Rhizoprionodon terraenovae</i>
Finetooth	<i>Carcharhinus isodon</i>
Blacknose	<i>Carcharhinus acronotus.</i>
Bonnethead	<i>Sphyrna tiburo</i>

### Pelagic Sharks

Shortfin mako	<i>Isurus oxyrinchus</i>
Porbeagle	<i>Lamna nasus</i>
Thresher	<i>Alopias vulpinus</i>
Oceanic whitetip	<i>Carcharhinus longimanus</i>
Blue	<i>Prionace glauca</i>

### Deepwater Sharks and Other Species

Iceland cat shark	<i>Apristurus laurussoni</i>
Smallfin cat shark	<i>Apristurus parvipinnis</i>
Deepwater cat shark	<i>Apristurus profundorum</i>
Broadgill cat shark	<i>Apristurus riveri</i>
Marbled cat shark	<i>Galeus arae</i>
Blotched cat shark	<i>Scyliorhinus meadi</i>
Chain dogfish	<i>Scyliorhinus retifer</i>
Dwarf catshark	<i>Scyliorhinus torrei</i>
Japanese gulper shark	<i>Centrophorus acuus</i>
Gulper shark	<i>Centrophorus granulosus</i>
Little gulper shark	<i>Centrophorus uyato</i>
Kitefin shark	<i>Dalatias Ucha</i>
Flatnose gulper shark	<i>Deania profundorum</i>
Portuguese shark	<i>Cetrosqymnus coelolepis</i>
Greenland shark	<i>Somniosus microcephalus</i>
Lined lanternshark	<i>Etmopterus bullisi</i>
Broadband dogfish	<i>Etmopterus gracilispinnis</i>
Caribbean lanternshark	<i>Etmopterus hillianus</i>
Great lanternshark	<i>Etmopterus princeps</i>
Smooth lanternshark	<i>Etmopterus pusillus</i>
Fringefin lanternshark	<i>Etmopterus schultzi</i>
Green lanternshark	<i>Etmopterus virens</i>
Cookiecutter shark	<i>Isistius brasiliensis</i>
Bigtooth cookiecutter	<i>Isistius plutodus</i>
Smallmouth velvet Dogfish	<i>Scymnodon obscurus</i>
Pygmy shark	<i>Squaliolus laticaudus</i>
Roughskin spiny dogfish	<i>Squalus asper</i>
Blainville's dogfish	<i>Squalus blainvillei</i>
Cuban dogfish	<i>Squalus cubensis</i>
Bramble shark	<i>Echinorhinus brucus</i>
American sawshark	<i>Pristiophorus schroederi</i>
Florida smoothhound	<i>Mustelus norrisi</i>
Smooth dogfish	<i>Mustelus canis</i>

### 1.3 Current Management of Sharks in the Pacific Ocean

In the Pacific, three regional councils are responsible for developing fishery management plans: the Pacific Fishery Management Council (PFMC), the North Pacific Fishery Management Council (NPFMC), and the Western Pacific Fishery Management Council (WPFMC).

The PFMC's area of jurisdiction is the EEZ off the coasts of California, Oregon, and Washington. Development of a Pacific Council HMS FMP is underway. The Council's HMS Plan Development Team has prepared a draft HMS IMP based on guidance from the November 2001 council meeting and an associated public hearing, which is now available for public review and comment. Final adoption of the HMS FMP is scheduled for March 2002. Updated information on the development of this FMP is available on the Council's website: <http://www.pcouncil.org/HMS/hms.html>.

The NPFMC covers Federal waters off Alaska, including the Gulf of Alaska and the Bering Sea/Aleutian Islands. Little is known about the status of shark populations in the North Pacific, and that Council has not yet developed management plans for sharks or other highly migratory species.

The area of the western Pacific comprises waters around the State of Hawaii, the Territories of American Samoa and Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and six other U.S. flag Pacific island groups under military (Wake Island, Johnston Atoll) or Federal control (Howland and Baker Islands, Jarvis Island, Kingman Reef and Palmyra Atoll, Midway Atoll). The WPFMC has developed a Pelagic Fisheries Management Plan for the pelagic fisheries of these areas, commonly referred to as the western Pacific region.

The Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region (WPPFMP) governing fisheries for tuna, billfish, and oceanic sharks was first completed in 1986 and has been amended on several occasions. The original WPPFMP defines the sharks belonging to the management unit as "oceanic sharks of the families Alopiidae, Carcharinidae, Lamnidae and Sphyrnidae." This rather loose definition means that a considerable number of primarily coastal sharks such as tiger sharks (*Galeocerdo cuvier*), sandbar sharks (*Carcharhinus plumbeus*) and Galapagos sharks (*Carcharhinus galapagensis*), which may venture into the pelagic realm, are also included under the WPPFMP. Table 1.2 lists the shark species most commonly caught by pelagic fisheries that are included as pelagic management unit species in the WPPFMP.

**Table 1.3 Shark Species Included as Pelagic Management Unit Species**

<b>Common Name</b>	<b>Scientific Name</b>
Blue shark	<i>Prionace glauca</i>
Thresher (bigeye)	<i>Alopias. superciliosus</i>
Mako (short fin)	<i>Isurus oxyrinchus</i>
White tip (oceanic)	<i>Carcharhinus longimanus</i>
Tiger shark	<i>Galeocerdo cuvier</i>
Miscellaneous sharks	<i>Families Carcharhinidae, Alopiidae, Sphyrnidae, and Lamnidae</i>

#### **1.4 U.S. Regulations to Implement the Shark Finning Prohibition Act**

On June 28, 2001, NMFS published a proposed rule to implement the Shark Finning Prohibition Act of 2000 [66 FR 3440 1 ]. This rule proposed the prohibition of: (1) any person on a U.S. fishing vessel from engaging in shark finning in waters seaward of the inner boundary of the U.S. exclusive economic zone (EEZ); however, U.S. fishermen would not be prohibited from removing and retaining fins from a shark, provided the corresponding carcass is retained on board the vessel; (2) any person on a U.S. fishing vessel from possessing shark fins harvested in waters seaward of the inner boundary of the U.S. EEZ on board a fishing vessel without corresponding shark carcasses; (3) any person on a U.S. vessel from landing shark fins harvested in waters seaward of the inner boundary of the U.S. EEZ without corresponding carcasses; and (4) any person on a foreign fishing vessel from engaging in finning in the U.S. EEZ and from landing shark fins in or inside the U.S. EEZ without the corresponding carcass. In addition, the rule proposed a requirement that all shark fins and carcasses be landed and weighed at the same time, once landing of shark fins and/or shark carcasses has begun. The prohibition on landing shark fins without the carcasses extends to any vessel (including a cargo or shipping vessel) that obtained those fins from another vessel at sea.

NMFS held two public hearings and considered all public comments, on the proposed rule. NMFS specifically requested advice on two matters: whether the prohibitions in the Act should be applied in State waters, and whether or how to define "wet" weight in considering whether sharks fins are being landed in excess of the allowable amount, relative to shark carcasses. Responses to public comments are provided in the preamble to the final rule. The final regulations were published on February 11, 2002. This document is available on the Office of the Federal Register's website at <http://www.access.gpo.gov/ecfr/>.

## **2. U.S. Imports and Exports of Shark Fins in 2001**

### **2.1 Imports of Shark Fins**

Tables 2.1 and 2.2 are based on information submitted by importers and exporters to the U.S. Customs Service. At the time this Report to Congress was prepared, 2001 data were available only from January through July. Data are provided for the same time frame in 2000 for purposes of comparison. It appears that imports and exports of shark fins have

declined slightly in both weight and value since the passage of the Act, although the final regulations prohibiting finning were not yet in place.

Most imports of shark fins were unloaded at the following ports in recent years: Hawaii, Guam, American Samoa, New York City, Miami, San Diego, San Francisco, and Los Angeles (Environmental Assessment for the Proposed Rule to Implement the Shark Finning Prohibition Act. NMFS, 2001). Other ports where lesser amounts of shark fins were unloaded include Maine, Detroit, El Paso, Philadelphia, Seattle and Chicago. In 2001, countries of origin included Argentina, Canada, Japan, Panama, Hong Kong, India, and China, with lesser amounts coming from Brazil, Costa Rica, Ecuador, and South Africa (see Table 2. 1). It should be noted that due to the complexity of the shark fin trade, fins are not necessarily produced close to or even in the same country as those from which they are exported. In the United States, factors such as availability of labor, overseas contacts, and astute trading all can play a role in determining the locale from which exports are sent (Environmental Assessment for the Proposed Rule to Implement the Shark Finning Prohibition Act. NMFS, 2001).

## **2.2 Exports of Shark Fins**

In 2000, the exports of dried shark fins from the United States to Asia totaled 365 mt (803,000 lbs), more than three times the 107 exported in 1999, and two and a half times more than the 141 mt (310,200 lbs) exported in 1998. In 2000, the U.S. Customs District recording the most exports was New York with 216 mt (475,200 lbs). Honolulu was second with 48 mt (105,600 lbs), and San Francisco third at 42 mt (92,400 lbs) (Environmental Assessment for the Proposed Rule to Implement the Shark Finning Prohibition Act. NMFS, 2001). Guam, the Northern Mariana Islands, and American Samoa are not included under direct U.S Customs jurisdiction, as each entity is responsible for monitoring exports and imports in their respective jurisdictions.

The vast majority of shark fins exported in 2001 (based on available data from January-July, 200 1) were sent from the United States to Hong Kong, followed by Taiwan and Mexico, with very minor amounts sent to France and South Africa (see Table 2.2).

A summary of trade data for previous years can be found in the Environmental Assessment for the Proposed Rule to Implement the Shark Finning Prohibition Act.

Table 2.1

Weight and Value of Shark Fins imported into the U.S., by country of origin  
(Source:U.S. Customs Service Data, NMFS website)

COUNTRY	KILOS    DOLLARS		KILOS    DOLLARS	
	Jan-July, 2000		Jan-July, 2000 Jan-July, 2001	
ARGENTINA	15,551	\$ 194,814	6,612	\$77,495
AUSTRALIA	1,100	\$ 13,750	0	\$ 0
BRAZIL	1,350	\$ 60,000	600	\$47,500
CANADA	6,066	\$243,962	6,262	\$24,203
CHINA	1,415	\$ 75,696	1,203	\$27,210
COSTARICA.	100	\$ 8,520	756	\$22,857
ECUADOR	572	\$ 3,600	66	\$ 3,297
GUATEMALA	2,097	\$ 31,360	0	\$ 0
HONG KONG	2,684	\$169,066	2,300	\$403,742
INDIA	1,000	\$ 7,500	1,872	\$12,000
INDONESIA	2,500	\$ 16,875	0	\$ 0
JAPAN	5,104	\$336,172	4,258	\$214,650
MEXICO	3,859	\$ 61,129	4,130	\$63,720
NICARAGUA	204	\$ 11,739	0	\$ 0
PANAMA	204	\$ 11,125	4,218	\$27,600
SOUTH AFRICA	0	\$ 0	125	\$ 8,575
TRINIDAD & TOBAGO	375	\$ 2,081	0	\$ 0
TOTAL	44,181	\$ 1,247,389	32,402	\$932,849

**Table 2.2 Weight and Value of Shark Fins exported from the U.S., by Destination**

EXPORTED TO COUNTRY	KILOS Jan-July, 2000	DOLLARS Jan-July, 2000	KILOS Jan-July, 2001	DOLLARS Jan-July, 2001
FRANCE	0	\$ 0	503	\$ 2,962
HONG KONG	118,588	\$1,183,549	82,591	\$ 732,602
JAPAN	200	5,300	0	0
MEXICO	0	\$ 0	2,756	\$ 16,250
SINGAPORE	13,895	\$ 81,950	0	\$ 0
SOUTH AFRICA	0	\$ 0	132	\$ 8,575
TAIWAN	0	\$ 0	9,224	\$ 54,392
THAILAND	16,542	\$ 46,133	0	\$ 0
TOTAL	149,225	\$ 1,316,932	95,206	\$ 814,781

### **3. International Efforts to Advance the Goals of the Shark Finning Prohibition Act**

Consistent with the provisions of Section 5 of the Shark Finning Prohibition Act, the Department of Commerce and the Department of State have initiated an ongoing consultation regarding the development of international agreements consistent with the Act. Discussions have focused on possible bilateral, multilateral and regional agreements with other nations. The law calls for us to pursue an international ban on sharkfinning, but also to push for improved data collection (including biological data, stock abundance and bycatch levels, and information on the nature and extent of shark finning and trade). Determining the nature and extent of shark finning is the first step toward reaching agreements that will decrease the incidence of finning worldwide.

#### **3.1 Bilateral Efforts**

Bilateral diplomatic contact provides an opportunity to communicate with other countries, but this is not necessarily a mechanism for immediate policy results. Thus far in 2001, the United States has held bilateral meetings with Japan (via video conference, February 2001 and September 2001), Spain (May 2001), Taiwan (May 2001), the European Community (July 2001), and Canada (August 2001). Implementation of the Shark Finning Prohibition Act was included on the agenda for each of these bilateral meetings.

The initial emphasis in these bilateral contacts has been on information collection and exchange, including requests for data such as shark and shark fin landings, transshipping activities, and the value of trade. In addition, the U.S. Government continues to encourage other countries to implement the International Plan of Action for the Conservation and Management of Sharks (IPOA), by finalizing their own National Plans of Action (NPOA) (see Section 3.3.1 for additional information). Not all countries have yet developed an NPOA, despite the FAO directive to complete this activity prior to February 2001.

#### **3.2 Regional Efforts**

The U.S. Government will continue to work within regional fishery management bodies to facilitate shark research, monitoring, and management initiatives, as appropriate. Possible avenues for the development of international initiatives that support the conservation of sharks include a number of regional fishery management organizations. The following sections describe recent activities in these international fora to provide a context for consideration of future actions.

##### **3.2.1 Northwest Atlantic Fisheries Organization (NAFO)**

NAFO's mission is: (1) to provide for continued multilateral consultation and cooperation with respect to the study, appraisal, and exchange of scientific information and views relating to fisheries of the Convention Area and (2) to conserve and manage fishery resources of the Regulatory Area, i.e., that part of the Convention Area which lies beyond the areas in which coastal states exercise fisheries jurisdiction. The Convention Area is located within the waters of the Northwest Atlantic ocean roughly north of 35 degrees north latitude and west of 42 degrees west longitude.

In 1998, the Fisheries Commission agreed to the following scientific recommendations regarding collection of scientific data and statistics on elasmobranchs: analyses of distribution and abundance; harmonization of NAFO and FAO catch data; training in identification and reporting of sharks; and an expanded list of elasmobranchs for NAFO reporting. Current catch statistics on elasmobranchs indicates a high level of potential fishing opportunities as well as danger of overfishing if scientific advice is not available.

In 1999, the Fisheries Commission requested that the Scientific Council: 1) summarize all available information from the Convention Area on catches of elasmobranchs (by species and geographical range); 2) review available information from research vessels surveys on relative elasmobranch biomass, geographical distribution, and extent of exploitation; and 3) initiate work to develop precautionary reference points for these resources.

At the NAFO annual meeting in September 2000, the Scientific Council presented the results of the 1999 Fisheries Commission request as it related to skates and dogfish in the NAFO Convention Area. Additionally, it was agreed that NAFO would convene a symposium on elasmobranch fisheries in 2002 in conjunction with the annual meeting. NAFO is also developing an identification poster for sharks, skates, and rays of the North Atlantic that complements the deepwater shark identification poster developed in 1998.

### **3.2.2 Inter-American Tropical Tunas Commission (IATTC)**

The IATTC was established to "(1) study the biology of the tunas and related species of the eastern Pacific Ocean with a view to determining the effects that fishing and natural factors have on their abundance, and (2) to recommend appropriate conservation measures so that the stocks of fish can be maintained at levels which will afford maximum sustainable catches." The Commission's duties were broadened in 1976 to include work on the problems arising from the tuna-dolphin relationship in the eastern Pacific. IATTC also collects and disseminates data on catch and effort of tuna fishing fleets in waters under its purview and collects information on implementation of and compliance with IATTC recommendations.

At its 66th meeting in June 2000, the IATTC agreed that minimizing bycatch of non-target species, including sharks, was important to maintaining healthy ecosystems overall and may require modified or new procedures, techniques, or management measures. The IATTC recommended a pilot program to require fishermen on purse-seine vessels to release promptly and unharmed, to the extent practicable, all sharks and other non-target species and to encourage fishermen to develop techniques and equipment to facilitate rapid and safe release. Member nations are implementing this recommendation, which will carry through 2002. A scientific review of the pilot program will be conducted in Spring 2002, and the IATTC will consider possible future changes based on the results. The IATTC also supported development of a program to research bycatch reduction and evaluate management measures to reduce bycatch such as time and area closures, limits on fishing effort, catch limits, and gear modifications. Depending on the effectiveness of the pilot program, the United States could propose a recommendation more specifically directed at data collection for or conservation of sharks, similar to the resolution adopted by ICCAT in 1994.

### **4.2.3 International Commission for the Conservation of Atlantic Tunas (ICCAT)**

ICCAT was established to provide an effective program of international cooperation in research and conservation in recognition of the unique problems related to the highly migratory nature of tunas and tuna-like species. The Convention area is defined as all waters of the Atlantic Ocean, including the adjacent seas. The Commission is responsible for providing internationally coordinated research on the condition of the Atlantic tuna and tuna-like species, and their environment, as well as for the development of regulatory recommendations. The objective of such regulatory recommendations is to conserve and manage species of tuna and tuna-like species throughout their range in a manner that maintains their population at levels that will permit the maximum sustainable catch. While ICCAT does not actively manage sharks at the present time, it has adopted some non-binding measures regarding data collection.

At the 1994 ICCAT meeting, Parties agreed to expand the Commission's research activities to include collection of bycatch statistics in tuna fisheries, including shark bycatch. The Standing Committee on Research and Statistics (SCRS) established a working group that concluded that information on shark bycatch was insufficient. The SCRS then recommended that efforts be undertaken to estimate bycatch for incorporation into ICCAT's statistical databases and to obtain more empirical evidence, such as through scientific observer programs.

In 1995, the Commission adopted a resolution encouraging cooperation with FAO on the study of shark stock status and bycatch. Since that time, the SCRS Sub-committee on Bycatch has noted that limited progress has been made on data collection. The low level of reporting may reflect the relatively low priority that countries place on monitoring the catches and bycatches of sharks. Improved data on sharks taken in both directed fisheries as well as bycatch in other fisheries will be critical to future evaluations of shark stock status.

Undertaking the research and management of shark species would be a significant expansion of ICCAT's work. In 1999, the United States introduced a non-binding resolution on sharks that encouraged: (1) improved data collection and reporting, (2) submission of NPOAs on sharks to FAO COFI, (3) adoption of domestic measures to prohibit shark finning and to protect juvenile sharks, (4) live release of juvenile sharks, and (5) consideration of ICCAT's role in the management of sharks. This resolution was not adopted.

In 2000, the SCRS recommended that ICCAT take the lead in conducting stock assessments for Atlantic porbeagle, blue, and mako sharks and that the initial stock assessment evaluations be scheduled for 2002. The SCRS further recommended that the Commission require that total catches and landings (including estimates of dead discards) of these three shark species be reported to SCRS. The SCRS has also recommended that all Parties be asked to supply other related data, such as tagging databases and databases resulting from genetic studies to ICCAT.

A data preparatory meeting was held in September 2001 to review the available catch statistics. The objective of this meeting was to review in detail the statistics for Atlantic pelagic sharks, with emphasis on Atlantic blue (*Prionace glauca*), porbeagle (*Lamna nasus*), and short-finned mako (*Isurus oxyrinchus*), with a view towards planning an assessment. The current database includes catch data from 1982-2000, although not all countries have sent data for the entire time series. For example, in 2000, only 25 of more than 80 countries had reported any catch data for sharks, and very few reported catch and effort or size frequency data. Many of the data that are reported are not classified by species. Another problem is that some countries submit their data in terms of number of fish, others in round weight, and others in dressed weight.

In light of these difficulties, the SCRS working group developed a number of recommendations. National scientists who have not already done so should carry out the analyses necessary to estimate historical catches of sharks and report them to ICCAT. Conversion factors for round weight, dressed weight and numbers of fish should be developed and adopted by the SCRS.

Observer programs could be augmented to improve information on dead discards of sharks. The group also suggested that one possible way to fill the information gaps, in the absence of official reporting, is to extrapolate based on estimates of the ratio of shark catches to the catches of directed tuna or swordfish fisheries.

The working group considered two assessment methods, both of which are general enough to utilize much of the available data for any species (e.g. catch, abundance indices, tagging, length frequencies, sex-specific data). Both models essentially are age-structured production models that can potentially be applied in a variety of situations, from data-poor to data-rich. Other alternative methods (e.g. non-equilibrium stock production models and direct estimation of mortality rates from tagging and catch statistics) may also be explored. It was suggested that the focus of a future assessment be on stocks that have not been assessed elsewhere, such as blue or shortfin mako sharks. The group concluded that 2004 would be a reasonable target date for a shark assessment.

### **3.2.4 Multilateral High-level Conference on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific (MHLC)**

On September 4, 2000, the United States and twenty-four other states and Taiwan concluded negotiations on the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean ("MHLC"). The Convention was adopted by 19 states voting in favor; Japan and Korea voting against; and China, France, and Tonga abstaining. (Tonga has since signed the treaty). Eleven states, including the United States, signed the Convention on September 5, 2000. The United States has been working with the other participants to encourage those states that objected to the adoption of the Convention or which have not yet signed it to do so.

The Convention will establish a Commission to conserve and manage highly migratory species in the vast area of the western and central Pacific west of 150° - meridian of west longitude. The Convention Area encompasses one of the last

major areas of the world's oceans not covered by a fisheries management regime. This region produces more than half the world's annual tuna catch, with an annual landed value of between \$1.5 to \$2 billion. The tuna harvested by U.S. vessels operating in the region has a landed value of between \$200-250 million annually, and an annual contribution to the U.S. economy of between \$250 million to \$500 million. The Convention establishes an effective system for ensuring the conservation and long-term sustainability of the highly migratory fish stocks of the region throughout their range. The Convention also accommodates the basic interests of the states fishing in the region, as well as those of the coastal states of the region, in a fair and balanced way.

The Pacific Island states control access to the fishing grounds where the majority of the purse seine catches occur. These states provide access to their exclusive economic zones through bilateral agreements with distant water fishing states. For many of the Pacific Island nations, these fish stocks are the only significant renewable natural resource and a key to their economic development aspirations. The United States has been cooperating with them since 1987 under the South Pacific Tuna Treaty (SPTT); the new Commission is expected to harmonize the terms and conditions under which fishing will occur within the convention area for all fleets in a manner similar to that agreed to under the SPTT. These include observer coverage, a vessel monitoring system, restrictions on transshipment, and catch and fishing effort reporting. The new Convention is fully consistent with the 1995 United Nations Fish Stocks Agreement and other recent global fisheries agreements. For instance, Article 5 "Principles and measures for conservation and management" flows directly from the UN Fish Stocks Agreement and includes provisions for the adoption of measures to minimize catch of non-target species.

The Convention will enter into force after ratification by three states situated north of 20 degrees north latitude (primarily the distant water fishing states) and by seven states south of 20 - north latitude (primarily the Pacific island states). In the meantime, a Preparatory Conference will begin administrative preparations for the entry into force of the Convention, such as drafting internal rules and procedures for adoption by the future Commission. Considerable work must be done within NOAA Fisheries in the next two years to become prepared to implement U.S. scientific, management, and enforcement obligations under the new Convention. Various participants in the MHLC process have demonstrated a commitment to shark conservation, and may be willing to help build support in this region.

It should be noted that while sharks are an important bycatch in the region, there are few fisheries within the Convention area that specifically target sharks, especially within the insular Pacific. Within the MHLC Convention area shark bycatch is believed to be greatest among the pelagic longline fleets. Many of these fleets utilize and retain various shark parts. However, there is a continuing absence of comprehensive information on the composition of the catch, processing, value, and marketing. Efforts to bridge these gaps are needed.

During the MHLC Precon period there is little likelihood that sharks will emerge as a critical area of emphasis; sharks are not specifically mentioned in the MHLC Convention. Rather, sharks and other bycatch issues (e.g. turtles and marine mammals) will be addressed through data collection and reporting requirements. There may also be efforts to regionalize and expand current stock assessments. Therefore, the United States should focus on ensuring that sharks are included in all reporting requirements and preparing to make a meaningful contribution to regional stock assessment efforts when these issues eventually emerge.

### **3.2.5 Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America (South Pacific Tuna Treaty - SPTT)**

The SPTT entered into force in 1988. After an initial 5-year agreement, the SPTT was renewed in 1993 and is scheduled to expire on June 14, 2003. The current agreement allows access for up to 50 U.S. purse seiners, with an option for 5 more if agreed to by all parties, to the Exclusive Economic Zones of the following countries: Australia, Cook Islands, FSM, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, Samoa. The overall SPTT area is 10 million square miles. Negotiations are underway for a third extension of the treaty.

The treaty is not a management arrangement, and as a result, does not include any conservation and management provisions for the target or non-target fish species. The treaty sets out operational requirements for U.S. purse seine vessels fishing within the treaty area and the terms of access for waters under the Pacific Island Parties' national jurisdiction. It has been viewed as a model of international and fishery cooperation. Issues that arise typically are addressed in formal annual consultations between U.S. Government and Pacific Island States representatives, or during informal discussions which also have taken place on an annual basis for the last 5 years. The Department of State has specific authority to act for the United States.

Sharks are a bycatch in the western and central purse seine fishery. Historically, the U.S. fleet in this area has never retained sharks for anything other than the fins or the occasional jaw. Typically the lower paid deck crew would fin high valued species after normal fishing operations. Any revenue obtained was never part of the vessels' overall fiscal operation. In late 1999, the U.S. tuna purse seine industry operating in the western and central Pacific, under the auspices of the United States Tuna Foundation, invoked a voluntary code of conduct that essentially banned the practice of shark finning on all vessels.

Sharks are not specifically mentioned within the current treaty language. However, shark catches must be reported on regional catch and effort logsheets. It is believed that current reporting and operational actions of the US vessels allow for sustainable harvests and no additional action should be invoked by the United States absent information to the contrary.

### **3.2.6 International Council for the Exploration of the Sea (ICES)**

The International Council for the Exploration of the Sea (ICES) is the oldest oceanographic organization in the North Atlantic and is the premier body for advice at the international level on scientific and policy matters relating to fisheries, pollution and other marine environmental issues. ICES provides advice on pollution matters to the London, Oslo, and Helsinki Conventions for Marine Pollution, and on fisheries matters to the Convention for the Conservation of Salmon in the North Atlantic Ocean; the United States is a party to all of these conventions. ICES also advises the North-East Atlantic Fisheries Commission and the International Baltic Sea Fishery Commission. ICES has strong formal ties to the Intergovernmental Oceanographic Commission, to which the United States belongs, and the annual ICES meeting is the major forum for coordinating research on living marine resources in the North Atlantic.

In 1997, the Study Group on Elasmobranch Fishes met to analyze data on the distribution of species, conduct analytical assessments and evaluate the effects of exploitation, and prepare identification sheets for deepwater sharks, skates, and rays. The Study Group recommended : 1) publishing identification guides to sharks, skates, and rays; 2) initiating data collection and biological sampling to improve knowledge on biology and exploitation patterns; 3) exploring alternative methods to evaluate the status of elasmobranch stocks; 4) sending an ICES representative to FAO and CITES meetings; and 5) keeping a register of available data on shark fisheries. While ICES has been suggested as a possible forum for conducting stock assessments for sharks, this organization does not have the authority to establish management measures.

### **3.2.7 Asia Pacific Economic Cooperation (APEC) and the Convention on Migratory Species**

At its 11th meeting- in July 2000, the Fisheries Working Group of the Asia Pacific Economic Cooperation (APEC) approved a U.S. initiated project for the conservation and management of sharks. This project seeks to facilitate regional implementation of the FAO International Plan of Action for the Conservation and Management of Sharks and is being organized by a steering committee composed of the United States, Mexico and Japan. APEC approved \$91,000 for this project and the United States will contribute another \$ 10,000 to the effort, due to be completed by November 2002. The project includes three parts: 1) a survey of regional implementation of the FAO International Plan of Action for Sharks; 2) the production of a Technical Manual for Policy Makers on Effective Techniques in Shark Fisheries Management; and 3) a regional conference on sharks to review the survey and technical manual and explore the possibility of a regional approach to shark conservation and management. The Regional Conference on Sharks will be held before November 2002 and is envisioned by the organizers to be a springboard to further regional activities on sharks, not necessarily confined to

the APEC process.

One option for the Pacific Ocean that APEC member economies will consider and on which they will make a recommendation at the workshop is the negotiation of a protocol under the Convention on Migratory Species (CMS). Though the United States is not a party to CMS, the Convention envisions non-party range state participation in species specific protocols, and for the United States to do so in this case would in no way bind us to any other part of the Convention. Another benefit of operating under CMS is that agreements negotiated under its rubric can be of either a binding or non-binding nature as the parties to the specific negotiation decide. Additionally, working under CMS allows countries to take advantage of the infrastructure of the CMS Secretariat without the need for creating a new international bureaucracy from scratch. Negotiating a new protocol on sharks does have the potential to require additional resources for activities conducted under it, depending on the nature of the agreement that is finalized. With the Pacific divided among several regional fisheries management organizations, none of which are specifically concerned with sharks, a region wide agreement giving basic steps that countries agree to take with respect to shark conservation and management could prove beneficial to the long term sustainability of shark stocks.

### **3.2.8 North Pacific Interim Scientific Committee for Tuna and Tuna-like Species (ISC)**

The ISC was formed by the United States and Japan in January 1995. The purposes of ISC are: (1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fisheries which inhabit the North Pacific Ocean during all or part of their life cycle; and (2) to establish the scientific groundwork, so at some future time a multilateral regime for the conservation and rational utilization of the region's pelagic fish stocks may be created. Membership in the ISC is open to all coastal States of the region, as well as States whose vessels fish for tuna or tuna-like species in the region. Canada, China, Taiwan (Chinese Taipei), Japan, Korea, Mexico, the United States, and several regional organizations have participated in past meetings.

On a practical level, the ISC regularly assesses and analyzes fishery and other information, prepares reports, formulates research proposals, and to the extent possible, coordinates international and national research programs on the relevant species. This is not a management organization, but the ISC has expressed concern over blue sharks.

### **3.2.9 Sub-Saharan Africa**

In May 2001, representatives from government, NGOs, and academia met in Capetown, South Africa for the International Fund for Animal Welfare African Shark Conservation and Management Workshop. The workshop recommended, *inter alia*, that all sharks, whether caught in directed fisheries or as bycatch, should, wherever possible, be landed with their fins and tails still attached, landing of fins without the corresponding carcasses should be prohibited, and that the Food and Agriculture Organization (FAO), and particularly the richer fishing nations and shark product-consuming countries, as well as others, should provide financial and technical assistance to developing countries to enforce these prohibitions and develop and implement National Plans of Action for Sharks in Africa. The United States will seek opportunities directly and through partnering with other interested countries and NGOs to encourage the implementation of these recommendations by coastal African states.

### **3.2.10 Department of State Regional Environmental Hub Program**

To address transboundary environmental issues, the Department of State has established regional environmental Hubs, located in twelve embassies around the world. The Hubs are predicated on the idea that transboundary environmental problems can best be addressed through regional cooperation. The regional environmental officer's role complements the traditional bilateral Environment Science and Technology officers stationed in embassies around the world. Rather than dealing with a single country on environmental issues, regional environmental officers will look at transboundary issues from a regional perspective. Hubs are located in: Addis Ababa, Ethiopia; Amman, Jordan; Ankara, Turkey; Bangkok, Thailand; Abidjan, Côte d'Ivoire; Brasilia, Brazil; Budapest, Hungary; Copenhagen, Denmark; Gaborone, Botswana;

Kathmandu, Nepal; San Jose, Costa Rica; and Tashkent, Uzbekistan. These Hub Officers will be important in the development and implementation of regional approaches to sharks and in particular in the building of support for anti-finning legislation and subsequent enforcement.

### **3.3 Multilateral Efforts**

#### **3.3.1 Food and Agriculture Organization of the United Nations (FAO) Committee on Fisheries (COFI)**

The FAO was founded in October 1945 with a mandate to raise levels of nutrition and standards of living, to improve agricultural productivity, and to better the condition of rural populations. The Committee on Fisheries (COFI), a subsidiary body of the FAO Council, was established by the FAO Conference at its Thirteenth Session in 1965. The Committee presently is the preeminent global inter-governmental forum where major international fisheries and aquaculture problems and issues are examined and recommendations addressed to governments, regional fishery bodies, NGOs, fishworkers, FAO and international community, periodically on a worldwide basis. COFI has also been used as a forum in which global agreements and non-binding instruments were negotiated.

In March 1997, a proposal was made at the 22nd Session of COFI that FAO organize an expert consultation to develop *Guidelines for a Plan of Action* for the improved conservation and management of sharks. This proposal culminated in the decision in February 1998 (FAO, 1998) to prepare an International Plan of Action for the Conservation and Management of Sharks (IPOA) through the meetings of the Technical Working Group on the Conservation and Management of Sharks in Tokyo from April 23 - 27, 1998, a preparatory meeting held in Rome from July 22 - 24, 1998, and the Consultation on Management of Fishing Capacity, Shark Fisheries, and Incidental Catch of Seabirds in Longline Fisheries, held in Rome from October 26-30, 1998.

In February 1999, COFI endorsed the *International Plan of Action for the Conservation and Management of Sharks* (see Appendix I for the full text). This plan was commended by the March 1999 FAO Fisheries Ministerial, endorsed by the June 1999 FAO Council, and adopted by the November 1999 FAO Conference. The IPOA builds upon the FAO *Code of Conduct for Responsible Fisheries*, encompasses all elasmobranch fisheries (commercial and recreational), and calls on all member nations to implement, voluntarily, the IPOA through the development of a national plan of action. Thus, the IPOA provides a valuable framework for data collection and information sharing.

The objective of the IPOA is to ensure the conservation and management of sharks and their long-term sustainable use. In the IPOA, member nations have agreed voluntarily to develop, implement, and monitor a national plan of action if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries. As stated in paragraph 22 of the IPOA, shark plans should aim to:

Ensure that shark catches from directed and non-directed fisheries are sustainable;

Assess threats to shark populations, determine and protect critical habitats, and implement harvesting strategies consistent with the principles of biological sustainability and rational long-term economic use;

Identify and provide special attention in particular to vulnerable or threatened shark stocks;

Improve and develop frameworks for establishing and coordinating effective consultation involving stakeholders in research, management, and educational initiatives within and between member Nations;

Minimize unutilized incidental catches of sharks;

Contribute to the protection of biodiversity and ecosystem structure and function;

Minimize waste and discards from shark catches in accordance with article 7.2.2. (g) of the *Code of Conduct for Responsible Fisheries* (for example, requiring the retention of sharks from which fins are removed);

Encourage full use of dead sharks;

Facilitate improved species-specific catch and landings data and monitoring of shark catches;

Facilitate the identification and reporting of species-specific biological and trade data.

Additionally, national plans of action are to be implemented by FAO members in a manner consistent with the FAO (1995) *Code of Conduct for Responsible Fisheries* and any applicable rules of international law, and in conjunction with relevant international organizations.

The U.S. National Plan of Action for the Conservation and Management of Sharks (NPOA) was developed by NMFS, in consultation with stakeholders, and finalized in February 2001. The NPOA includes provisions for: assessing levels of directed and incidental catch and bycatch of elasmobranchs, data collection (including collection of habitat and bycatch data), outreach and education of fishermen, exchange of information on shark fisheries and studies, and assessing the effectiveness of management measures. For Federally managed fisheries, the Magnuson-Stevens Act provides the basis and authority for these provisions. As such, these provisions are consistent with the Magnuson-Stevens Act and its National Standards and therefore should already be encompassed in existing FMPs or addressed in the development of FMPs or IMP amendments. The United States NPOA for the Conservation and Management of sharks is available on the NMFS website: [www.nmfs.noaa.gov](http://www.nmfs.noaa.gov).

### **3.3.2 International Union for Conservation of Nature and Natural Resources (IUCN)**

The *International Union for Conservation of Nature and Natural Resources* (IUCN) is an umbrella organization of the world's conservation agencies and institutions. It includes both governmental and non-governmental members. The IUCN actively supports the conservation of biological diversity and the sustainable use of living resources. The IUCN has six Commissions, including the *Species Survival Commission* (SSC), the largest and most active unit. Within the SSC are a series of specialist groups composed of conservation experts which promote action to arrest the loss of the world's biological diversity and to restore threatened species to safe and productive population levels. The *Shark Specialist Group* (SSG) and its regional shark specialist groups are composed of elasmobranch specialists willing to donate their time in identifying the problems associated with the maintenance of elasmobranch stocks in their regions. The United States has many scientists and conservationists active in SSG activities.

One of the SSG's first goals upon formation was to consolidate regional status reports into a global Action Plan for the conservation of sharks. The Action Plan will highlight global and regional problem areas and is anticipated to be a useful tool in attracting funding to support needed elasmobranch research programs. Similar Action Plans generated by other SSC Specialist Groups have proven to be valuable documents that have guided the direction of conservation and aided in the procurement of research funding. The SSG's Action Plan is now being developed with release expected within a year.

With lack of data on biological and catch information of shark species a central obstacle to sustainable shark fisheries, the work of the SSG is central to the goals of the Act. One problem facing the SSG is that many of the regionals have very sparse or sometimes no participation. The United States has contributed funds to the SSG in recent years, and subject to availability of funds, will continue to do so. In addition, through diplomatic and other channels, we will make the every effort to broaden and deepen participation in the SSG to help ensure that the work of the SSG is as complete and accurate as possible. A truly worldwide network of shark specialists will prove invaluable, first in the formulation of, and second in the creation of broad-based support for implementation of new international policies and initiatives on shark conservation and management.

### 3.3.3 Convention on International Trade in Endangered Species of Wild Fauna and Flora

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a multilateral treaty that regulates international trade in selected animal and plant species. Although CITES is legally binding on the Parties (signatory countries) - in other words they have to implement the Convention - it does not take the place of national laws. Rather it provides a framework to be respected by each Party, which has to adopt its own domestic legislation to implement CITES at the national level. In the United States, this is accomplished through the Endangered Species Act and implemented by the U.S. Fish and Wildlife Service (USFWS).

No species protected by CITES has become extinct as a result of trade since the Convention entered into force in 1975 and, for many years, CITES has been among the largest conservation agreements in existence, with now over 150 Parties. CITES works by subjecting international trade in specimens of selected species to certain controls. These require that all import, export, reexport and introduction from the sea (trading in specimens from the high seas) of species covered by the Convention has to be authorized through a licensing system.

The species covered by CITES are listed in three appendices, according to the degree of protection they need:

Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances

Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid over-utilization

Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

Each Party to the Convention must designate one or more Management Authorities in charge of administering the licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species. A specimen of a CITES-listed species may be imported into or exported (or re-exported) from a State party to the Convention only if the appropriate document has been obtained and presented for clearance at the port of entry or exit. Aquatic species comprise a relatively small proportion of CITES-listed taxa, but include heavily traded groups like sturgeon and their caviar (Order Acipenseriformes), queen conch (*Strombus gigas*), corals (Orders Scleractinia, Antipatharia, and others), and giant clams (Family Tridacnidae).

There are no inconsistencies between the CITES treaty and the Shark Firing Prohibition Act (Act). None of the CITES permitting provisions would violate or contradict the provisions of the Act, and none of the Act's requirements violate CITES protocol. There are two species of sharks listed in Appendix III: great white (*Carcharodon carcharias*) by Australia, and basking shark (*Cetorhinus maximus*) by the United Kingdom. Neither of these species can be landed in most of the United States because of federal and state management measures, and CITES allows such stricter domestic measures. Both of these CITES listings are supported by the United States.

In the future, other sharks may benefit from CITES protection because increasing international trade in sharks and shark products is contributing substantially to declining stocks. With respect to international trade, the international shark fin market, centered in Asia, represents a lucrative and growing industry that may threaten the long-term viability of many shark populations around the world. As discussed below, the protection and trade monitoring afforded by CITES may prove useful for conserving these species on a global scale.

A majority of CITES Parties have seen the potential benefits of listing shark species in Appendix I (the sustainable use Appendix of the treaty). At the last CITES conference (April, 2000), three Appendix II shark listing proposals (great white, whale shark, and basking shark) gained a majority of Parties' votes but failed to gain the required two-thirds to be

formally adopted. At the conference, the United States proposed the whale shark (*Rhincodon typus*) for listing, cosponsored the great white proposal with Australia, and supported the United Kingdom's proposal for basking shark. The United States took these positions because it believes that CITES offers numerous benefits for marine species conservation. These include enhanced and systematic trade monitoring, encouragement of national fishery management plans to bolster permit issuance, and regular reviews of trade patterns.

The United States acknowledges that there are some obstacles, although surmountable, to efficient shark listings under CITES. These include lack of clear guidelines for permitting specimens taken on the high seas ("introduced from the sea" in CITES parlance), timely permit issuance for perishable shark products, and problems with product identification. Failure to address these problems before and after any shark listing will compromise the effectiveness of CITES for those taxa, and diminish future interest in listing species in need of protection.

The United States remains engaged on all of the issues listed above, and is striving to resolve problems by industry consultation, federal agency cooperation, and international discussion. The Introduction from the Sea problems were discussed at length at the last CITES conference, and advances were made to clarify the treaty's intent with respect to high seas fishery products, including sharks. Permit timeliness has been improved through U.S. experiences with caviar, biomedical samples, and the live pet trade. Product identification has been improved at ports of entry by use of the United Kingdom's shark fin identification manuals, and the USFWS National Fish and Wildlife Forensics Laboratory is ready to assist in developing DNA markers for product identification.

A primary argument of many of those countries arguing against the listing of sharks is that CITES should defer dealing with marine species to other international organizations, in particular the FAO, which is the global body with the technical expertise and mandate to deal with commercial fisheries. While steadfastly supporting the right of CITES to consider all species for listing that meet the biological criteria, the United States also recognizes the important role that FAO can play in ensuring that CITES has the best expertise available when considering marine species for listing. FAO and CITES have recently embarked on a new era of cooperative dialogue that the United States believes could lead to a resolution of some of the issues discussed above. If successful, this initiative will improve the abilities of both organizations to contribute to the effective conservation and management of marine fish species. The United States is a strong advocate of coordination between CITES and FAO and will work for that cooperation to continue as part of this strategy.

Developing countries also pose a challenge, as they often need assistance to effectively implement CITES for sharks or other taxa. This is currently addressed through several parallel processes, including the CITES Secretariat's capacity building program, overseas CITES training sessions, and training grants issued by various federal agencies. As per the mandates of CITES, the United States consulted with all range countries prior to proposing whale sharks and great white sharks at the last CITES conference. Such consultations provide an opportunity to gauge the will and interest of developing countries in implementing shark listings, and allows the United States to identify those with particular training/funding needs. Recognizing the increased demands that a listing of a commercially exploited shark species would place on the CITES system, the United States has an obligation when supporting such listings to contribute resources and technical expertise to effectively monitor trade, particularly if developing countries are impacted by the listing.

Sharks are unique species that are vulnerable to overexploitation, as evidenced by stock declines in every ocean. CITES trade controls can be an effective supplement to traditional regional management measures, or could provide the sole source of protection in many cases. Contrary to some countries' perceptions, the CITES treaty was designed to address marine species, as evidenced by language in Article XV Par. 2(b) that requires consultation with bodies administering RFMPs or IPOAs. The United States continues to support the concept of CITES as an effective conservation tool for sharks, but understands that several implementation issues must be addressed concomitantly with any listing actions.

#### **4. NMFS, Research on Sharks**

## 4.1 Data Collection and Stock Assessments

### Southwest Fisheries Science Center (SWFSC) Honolulu Laboratory

*Pacific Oceanic Shark Population Biology:* This project began with a literature review to provide biological information needed for stock assessment of pelagic shark species taken by foreign and U.S. longline fisheries in the central North Pacific and also for simulation models of shark populations and their ecosystem relationships. Aside from the predominant blue shark, other oceanic shark species are poorly documented in fisheries statistics, inviting novel approaches to assessment including simulations of productivity based on an understanding of differences in life history characteristics and ecology.

A demographic technique formulated to compare the intrinsic rate of population increase in sharks was used across disparate taxonomic groups to evaluate its potential in creating a theoretical index of concern for pelagic shark species in the central Pacific Ocean. These rates are a theoretical measure of a species ability to recover from population declines caused by overharvesting or other anthropogenic mortality. The method is useful in application to species where little documentation exists as to life history, migration patterns, and stock characteristics. Biological information on female age at maturity, maximum reproductive age, and average fecundity were the only parameters used in this density dependent population model to estimate a theoretical rebound potential for each species. The rebound potential (expressed as a doubling time of a population) for pelagic sharks ranged from 10-36.2 years. The doubling time for large bodied, low fecundity, long-lived mammals ranged from 20.6-37.3 years. Relatively fast growing, fecund, short-lived mammals and fish ranged from 5-10.7 years. These results were presented at the 52<sup>nd</sup> Annual Tuna Conference in Lake Arrowhead, CA. May 21-25, 2001 (Curran, D.S., and C.H. Boggs. 2001. The Use of Intrinsic Rebound Potential Indices in Comparing Disparate Species Groups. Abstract.)

Ecosystem modeling, focusing on the role of sharks as predators, was conducted using ECOPATH and ECOSIM models. Preliminary (2000) results indicated that removal of sharks from the pelagic system, predominantly by longline fisheries had little effect on simulated trophic structure or the abundance of the other dominant taxa in the system. The preliminary model did suggest that decreased shark mortality due to a simulated Pacific-wide ban on shark finning could have a deleterious effect on turtle populations via increased predation from large sharks. The ECOSIM model was reexamined in January of 2001, using more realistic estimates of turtle mortality, and found that cessation of longline fishing had little influence on turtle populations because fishing mortality and mortality due to removed sharks was roughly balanced.

A whole shark size estimation relationship that can be applied via monitoring of fins was developed for blue shark based on samples collected during many years of longline research on the NOAA Ship *Townsend Cromwell*. Since shark catches are poorly reported in many fisheries and fins are frequently the only identifiable portion of shark catches that ever reach shore. With the advent of a ban on shark finning in the Hawaii longline fleet, collection of sufficient fin versus whole shark data from the commercial fishery for use in developing similar relationships for other shark species was abandoned.

Analyses of shark catch-per-unit- effort (CPUE) in relation to fishing depth and subsurface temperature structure provided from field studies deploying time-depth-temperature recorders (TDTRs) on commercial fishing vessels were completed. These analyses provide information for CPUE standardization methods based on the overlap between fishing hook depths and the vertical distribution of the preferred habitat of oceanic shark species. Habitat, movement, and postrelease mortality data will also be obtained through archival tagging of sharks. Such data will help identify the range of shark stocks for assessment purposes and help in estimating a mortality rate for the huge number of sharks that are discarded alive from longlines. A longline research cruise conducted in April of 2001 resulted in the successful attachment of 14 blue sharks and 1 oceanic white-tip shark with pop-up archival tags, while biological samples and morphometric measurements were obtained from dead or moribund sharks caught on the cruise. A study of the geolocation capabilities of the archival tags was also completed (Musyl, M.K., R.W. Brill, D.S. Curran, J.S. Gunn, J.R. Hartog, R.D. Hill, D.W. Welch, J.P. Eveson, C.H. Boggs, and R.E. Brainard. 2001. Ability of archival tags to provide estimates of geographical position based on light intensity. Reviews in Fish Biology (In Press)). Blue sharks tagged with pop-off

satellite archival tags will also enable researchers to examine stock identification, dispersal, fishery interactions, pupping areas and possible genetic structuring.

*Blue Shark Assessments:* This project is a collaborative effort between scientists at the Honolulu Lab and at the National Research Institute for Far Seas Fisheries in Shimizu, Japan to conduct an assessment of blue sharks in the north Pacific. New input data are being processed so that Taiwanese and Korean longlines can be added to the mix of fisheries considered in the original analysis. A comprehensive report on the methods and results of the analyses is in preparation, and a presentation is planned for the upcoming National Stock Assessment Workshop titled "Estimating Shark CPUE in Longline Fisheries When Most Fishermen Don't Report Shark Catch"

### **Northwest Fisheries Science Center (NWFSC)**

The Groundfish Fisheries Management Plan (FMP) of the Pacific Fishery Management Council includes 3 shark and 3 skate species. Several Northwest Fisheries Science Center (NWFSC) data collection programs and academic collaborations are providing limited information on these species, which will lead to an initial assessment of the status of these and other Pacific coast elasmobranch species. The goal of these assessments will be to determine, to the extent possible, whether the level of total fishing mortality of sharks, skates, and rays is sustainable. However, available information is primarily from multi-species data collection programs, so may not be sufficient to provide much precision in these assessments, and may not support any quantitative assessment of some species.

There are three primary sources of ongoing information: trawl surveys, fishery landings, and fishery observers. Bottom trawl surveys collect information on abundance of all encountered species, including elasmobranchs. This multi-species survey may sufficiently cover the habitats of some shark, skate and ray species to provide a useful index of their abundance. The most recent survey was conducted in summer 2001, and was used as an opportunity to collect additional age and maturity data for spiny dogfish. Landings of elasmobranchs are recorded on state landings receipts, although exact species information is not always recorded. A new fishery observer program was initiated in September 2001. It will provide information on elasmobranch bycatch on fishing trips that target other groundfish and information on trips that target sharks and skates within the broad range of groundfish activities. Collectively, these three sources of data may provide, for some elasmobranch species, the basis for tracking trends in abundance, amount of total and retained catch, and areas of encounter.

In 2001, a collaborative stock assessment improvement program with the University of Washington provided sponsorship for a student to conduct a spiny dogfish population investigation that will form the basis of a stock assessment within a couple of years. This collaboration has enabled placement of students on the NMFS trawl surveys to collect additional biological information on sharks, and has helped to initiate collaborative work with Washington Department of Fish and Wildlife, the University of Washington, and others to investigate sixgill sharks in Puget Sound and adjacent waters.

An update of the characterization of essential fish habitat for Pacific coast groundfish is to be initiated in 2002. This update will include information on the shark and skate species included in the groundfish FMP, and will provide general information on the habitat utilized by other semidemersal elasmobranchs found off the U.S. Pacific coast.

### **Alaska Fisheries Science Center**

*Shark Research and Assessments:* Planning is underway to begin shark stock assessments in FY 2002. Current research focuses on sleeper shark predation on and habitat overlap with Steller sea lions. Stomach content examinations and fatty acid analysis of tissues from sleeper sharks captured around rookeries during periods of Steller sea lion pup vulnerability are conducted to quantify predation rates. Satellite pop-up tags are used on sleeper sharks and Steller sealions to examine their respective habitat uses and to determine levels of habitat overlap. This work will continue during FY 2002.

### **Northeast Fisheries Science Center (NEFSC)**

The NEFSC conducted its bi-annual assessments to: 1) monitor the distribution, abundance, and species composition of sharks in coastal Atlantic waters from Florida to Delaware; 2) tag sharks for migration studies; 3) collect biological samples for age and growth, feeding ecology, and reproductive studies; 4) tag sharks whenever feasible for age validation studies; and 5) collect morphometric data for other studies. Catch data and biological samples for basic life history studies (e.g., age and growth, and food habits) were collected from sharks landed during recreational fishery tournaments.

*Cooperative Shark Tagging Program (CSTP)*: Continued to operate the shark tagging program made up of over 6000 participating commercial and recreational fisherman, and research scientists. Over 160,000 sharks (>50 species) have been tagged in the program with over 7,000 returns since it was initiated in 1962.

*Cooperative Atlantic States Shark Pupping and Nursery Survey (COASTSPAN)*: Researchers in each major coastal Atlantic state conducted a cooperative, comprehensive and standardized investigation of valuable shark nursery areas. This research will identify which shark species utilize coastal zones as pupping and nursery grounds, gauge the relative importance of these areas and determine migration and distribution patterns of neonate and juvenile sharks.

*Investigations into Nurse Shark Mating and Nursery Grounds in the Florida Keys*: Conducted analyses of reproductive biology and habits of nurse sharks in the Dry Tortugas, FL to understand life history and ecology of the species. Information from this research will be utilized to define essential fish habitat and manage the species. This project will continue in CY2002.

*Habitat Utilization of Delaware Bay Sandbar Shark*: This research is a study of the movements of juvenile sandbar sharks in Delaware Bay, a known nursery area, to quantify their habitat use and activity patterns using acoustic techniques. Acquired data will allow quantification of home range (minimum area required) and, when coupled with environmental data, information on preferred habitat. This information will be an important contribution towards understanding essential fish habitat and will provide information necessary for nursery ground management and rebuilding of depleted shark populations.

## **Southeast Fisheries Science Center**

The National Marine Fisheries Service/Southeast Fisheries Science Center in Panama City, FL is responsible for the assessment of shark populations in US waters from the northwest Atlantic Ocean and Gulf of Mexico. Its main \* activities include stock assessment and demographic modeling through a variety of modeling approaches. Data collection includes fisheries and biological work in support of these activities. Fishery work includes an observer program designed to monitor catch and bycatch in the directed shark gillnet fishery and an ongoing inshore fishery independent survey on shark distribution and abundance, and essential fish habitat requirements for sharks. Biological studies focus on age and growth, but also include other aspects of the life history of sharks such as reproduction, feeding, distribution and movement patterns, and delineation and characterization of nursery areas. Quantitative experiments include gillnet and longline selectivity studies.

*Shark drift gillnet observer program*: The observer program for the shark drift gillnet fishery, which operates in coastal waters of the southeast US, obtains estimates of catch, bycatch and bycatch mortality rates of sharks, protected species, and other fish species in the southeast US coastal directed shark gillnet fishery. Fishing fleet data (e.g. number of vessels, gear type, areas fished, effort) for this fishery is updated bi-annually. This is an ongoing program.

*Fishery-independent surveys*: A fishery-independent assessment of coastal shark populations in U.S. waters of the northeast Gulf of Mexico is conducted monthly during April-October. Data obtained through this survey provide information on catch rates, nursery utilization and characterization, essential fish habitat requirements, and life history. Publications from this ongoing program have been produced intermittently since its inception in 1996.

*Life history studies:* Biological samples have been obtained since 1993 through research surveys and cruises, recreational fishers, and through collection by onboard observers on commercial fishing vessels. Age and growth rates and other life history aspects of selected species are processed and data analyzed following standard methodology. This information is vital as input to population models incorporating variation and uncertainty in estimates of life-history traits to predict the productivity of the stocks and ensure that they are harvested at sustainable levels.

*Stock assessments of coastal sharks:* Stock assessments are conducted on small and large coastal sharks from the U.S Atlantic, Gulf of Mexico and Caribbean. The assessments include estimation and analysis of catches and landings (species-specific, some data are gear- and region-specific); collection, analysis, and standardization of catch rate (CPUE) information from fishery-dependent and fishery-independent sources through Generalized Linear Modeling approaches; analysis of abundance trends; and analytical stock assessment using Bayesian simulation of the effects of fishing on single species and/or species complexes, with risk analysis. New assessments for large and small coastal sharks are planned for 2002.

*Demographic modeling of sharks under uncertainty:* A study on demographic modeling of sharks under included estimation of natural mortality rates of sharks through indirect life history methods, and incorporated uncertainty in vital rates on demographic analyses of sharks. Monte Carlo simulation was used to incorporate uncertainty into life tables and matrix population models and estimate population statistics and elasticities for 41 shark populations. Correlation analysis was also used in concert with elasticity analysis to identify which vital rates explained most of the variation on population growth rates and provide advice for conservation and management. A publication detailing this study is expected to be available in the summer of 2002.

*Update on shark catches and catch rates:* Each year, an update on catches and catch rates of pelagic sharks in U.S. Atlantic, Gulf of Mexico and Caribbean waters is generated. This work compiles commercial and recreational landings and discard estimates of pelagic sharks from several sources, updates catch rate information, and analyzes catch rate trends for pelagic sharks. This information on pelagic sharks, which are transoceanic and harvested by fishers from several nations, is required for multinational assessment of these resources through the International Commission for the Conservation of Atlantic Tunas (ICCAT).

*Population dynamics of finetooth sharks:* The life history and population dynamics of the finetooth shark were studied by determining age, growth, size-at-maturity, natural mortality, productivity, and elasticity of vital rates of the population. Results suggest the finetooth shark exhibits life-history traits and population parameters that fall between those of the blacktip shark and those of other small coastal species. Population analysis indicates management actions should focus preferentially on protection of juveniles and adults rather than age-0 individuals. A publication on this study is expected in the summer of 2002.

## **4.2 Incidental Catch Reduction**

### **Southeast Fisheries Science Center**

*Gillnet selectivity for small coastal sharks:* Despite the importance of gillnet selectivity in fisheries assessment and management, there are few estimates for sharks. Goals of this study are to develop selectivity parameters for 4 species of sharks from the small coastal aggregate. Information from this study will aid in recommendations to maximize or minimize the catch on certain shark sizes and be used as inputs to age structured stock assessment on sharks. Results will be published in the fall of 2002.

## **4.3 Post-Release Survival**

### **Southwest Fisheries Science Center**

*The survival rates of blue sharks captured and released from commercial longline fishing gear:*

The survival rates of blue sharks captured and released from commercial longline fishing gear are being examined using pop-up satellite archival tags. The morbidity of released fish will also be determined by examination of diel horizontal and vertical movement patterns. Results from this study will be correlated to work through a second study (described below) designed to develop biochemical and physiological predictors of long-term survival in released blue sharks.

*Developing Biochemical And Physiological Predictors Of Long Term Survival In Released Blue Sharks:* Even when recreational anglers and commercial fisherman practice good catch-and-release fishing, delayed mortality is a distinct possibility. Tag-and-release programs are important tools to assessing post-release survival, but they can be difficult and expensive to implement. Conclusions from tag-and-release studies are rarely extrapolated to other species because of the many factors (e.g. size, water temperature, fight time and fishing gear) that may influence survivability or mortality. This study uses a novel approach to study the basis of post-release mortality. Rather than assessing how many fish survive, we try to understand why fish die. A set of diagnostic tools is being developed to assess the biochemical and physiological status of sharks caught by long line on scientific cruises. These tools will be used in combination with pop-off satellite archival tag (PSAT) data to establish correlates of survival or mortality.

This work has focused on assessing the extent of tissue damage arising from capture using comprehensive analyses of ions, metabolites and proteins found in the. For example, the damage to myocardial tissue upon a heart attack causes release of proteins such as creatine phosphokinase and troponin I into the plasma. Properties of blood cells themselves are also being used to assess the extent of systemic oxidative damage. Under stressful conditions, a series of genes are induced leading to synthesis of mRNA and protein corresponding to the heat shock proteins (hsp). Hsp70 induction has been used in a number of fish models as an index of cellular damage.

#### **Northeast Fisheries Science Center**

*Post-release Recovery and Survivorship Studies in Sharks: Physiological Effects of Capture Stress:* This research is directed towards the sandbar shark and utilizes blood and muscle sampling methods in addition to acoustic tracking to obtain a physiological profile to characterize stamina and to determine ultimate post release survival. These data are requisite in view of the extensive current and proposed catch and release management strategies for coastal and pelagic shark species.

#### **5. Conclusion**

The management of shark species poses a considerable challenge due to the biological characteristics that make these stocks vulnerable to overfishing, and their highly migratory nature, which necessitates the coordination of management across political boundaries. NMFS is committed to ongoing research efforts domestically, as well as international efforts in cooperation with the Department of State, in order to address the need for shark conservation on a global scale.